designed for the use of students in their second college term. Each preparation is introduced by a short theoretical discussion of the reaction involved, followed by details of procedure, and a number of suggestive questions which the student is required to answer in his note-book. The scheme is excellent, and if conscientiously followed should afford an intelligent student the full benefit of each experiment. He is not supposed to work right through the book, but the experiments are to be distributed among the students, who are encouraged to be inquisitive as regards their neighbours' activities, and so acquire indirectly all that the book contains. Considering that the matter is not very original, that there are no illustrations, and only eighty-nine pages of print, the price of 4*s*. 6*d*. seems rather high.

(5) If "The Fundamental Conceptions of Chemistry" were printed as an *aide-mémoire* for a candidate for the Inter. B.Sc., we should consider that the 179 small pages of compressed general chemistry might serve a useful if not very dignified purpose. The book is full of facts and theories laid down in didactic fashion and with that want of precision and clear exposition which characterise the tutorial text-book. We cannot agree with the author that the book will "accustom the student to the methods of chemical reasoning," unless, of course, chemical reasoning is, as one is sometimes inclined to think, a different mental process from other kinds of reasoning. Nor do we agree with him in admiring the elegance displayed in the get-up of his book. We must, however, commend one special feature, namely, the historical references, which are numerous and generally accurate. It is interesting to learn the Christian names of chemists, who do not usually appear to have any. Such, for example, are Cato Maximilian Guldberg, Peter Waage, and Eilhardt Mitscherlich; Dulong and Petit are, however, coupled together, as usual, without Christian names. We should dissent from Dalton being described as a Manchester schoolmaster, and from the statement that owing to the discovery of oxygen, "Lavoisier was able to realise what Mayow's genius had arrived at a hundred years before."

(6) Dr. Bryk's "Repetitorium" is what it professes to be—a mere compilation of important facts to assist the student's memory. It has been put together apparently with great care, and there are many useful tables containing a general summary of compounds of different elements. To anyone desirous of assimilating large quantities of information, the book may be safely commended; but we cannot promise that he will be intellectually stimulated by its perusal. J. B. C.

OUR BOOK SHELF.

Experimental Elasticity. A Manual for the Laboratory. By G. F. C. Searle, F.R.S. Pp. xvi+187. (Cambridge: University Press, 1908.) Price 5*s*. net.

THE author has embodied in this volume in a connected form the contents of a number of manuscripts which he had from time to time written for the use of students attending his class in practical physics at the Cavendish Laboratory. Chapters i. and ii., consisting of 70 pages, give an account of the elementary theory of elasticity, with solutions of some special mathematical problems. Chapter iii., pp. 71–161, describes the experiments—numbered 1 to 14—prescribed for the student. Pages 162–183 comprise ten short notes, mostly on mathematical subjects. There is a table of contents and an index.

The experiments, which relate mainly to the determination of Young's modulus and the rigidity in materials assumed isotropic, are very carefully described. The apparatus, which seems mostly designed by the author, is usually simple, and the student who goes through the course intelligently should have learned a good deal. The illustrations of Saint Venant's principle of "equipollent" systems of force in chapter ii., due to Dr. Filon, are likely to be useful.

Notwithstanding the merits of the book, it is a little difficult to picture a student for whom it would form the best possible introduction to the subject. The reader who requires the notes at the end seems hardly likely to follow the mathematical investigations into the differences between adiabatic and isothermal elasticity in chapter i., or into the bending of a rod and the bending and twisting of a blade in chapter ii. The ordinary student would probably get a better grasp of the mathematical theory of elasticity from a study of the ordinary stress-strain and surface equations, and their application to a few really simple problems.

The author's attitude towards the application of isotropic elasticity to wires leaves something to be desired. On p. 113 he gives a table of values of Poisson's ratio obtained by the method of one of his experiments. In five out of nine cases the value is impossible, exceeding 0.5. The impossibility, it is true, is pointed out, the phenomenon being ascribed to lack of isotropy. But this is much as if a temperance lecturer illustrated the evil effects of intemperance in his own person. A safer course would be to confine the table to cases where isotropy is at least not obviously untenable, adding a warning that wires are frequently neither isotropic nor homogeneous, and that absurd results are often obtained by assuming that they are. It would also be as well to let physical students know that isotropy is not the only type of elasticity amenable to mathematical treatment. Vibrations in thin wires are theoretically a less satisfactory method of finding elastic constants for materials than are vibrations in long rods, but possibly Mr. Searle is reserving vibrations in rods for one of the further volumes adumbrated in his preface. C. CHREE.

Beautiful Flowers and How to Grow Them. To be completed in 17 parts. Edited by Horace J. Wright and Walter P. Wright. With 100 coloured plates. (London: T. C. and E. C. Jack.) Price 1*s*. net each part.

THE first part is concerned entirely with roses, and includes twenty-four pages of letterpress. The writer discourses upon roses from the point of view of the garden decorator rather than that of the exhibitor, and, indeed, the mere exhibitor is given very little consideration. This is very natural in such a work as this, which is undoubtedly intended for amateurs who wish to grow flowers for their own sake alone, and not for the glory that attends the winning of prizes at competitive exhibitions.

The style is pleasant, and the reader is given an insight into the classification of roses in order to enable him to understand the characteristics of the numerous types. Even the novice may soon acquire some knowledge of the hybrid teas, teas, hybrid perpetuals, noisettes, moss rose, polyantha rose (*Rosa multiflora*), the Wichuraiana roses (including such esteemed varieties as Dorothy Perkins, Lady Gay, and Hiawatha), and other types. Some of these are

suitable for cultivation in beds and borders, whilst others may be used for adorning pergolas, arches, pillars, summer-houses, or other structures. Directions are given for cultivation and propagation, the process of budding being explained fully and illustrated with appropriate cuts. Those who are not familiar with the varieties will find the selections of roses for different purposes of great assistance in choosing those which will be most suitable for their particular gardens.

The text is large, bold print, and this being upon parchment paper, the convenience of the reader has been obviously studied. The coloured plates have been prepared from paintings of well-known artists, and many of them are pleasing, but others are too impressionist in character, particularly that representing a Dorothy Perkins rose growing upon old trees. The effect of the rosy crimson flowers is depicted, but one cannot in the least trace any rose foliage, and even the plant itself takes no shape, and, therefore, cannot be distinguished.

The second part contains the concluding portion of the letterpress on roses, and the remaining pages are devoted to bulbous plants. The third part is a continuation of the matter concerning bulbs. It contains excellent coloured plates of *Lilium speciosum*, "Christmas Roses and Glory of the Snow," and "Madonna Lilies and Roses." These are the best plates in the third part, and the figure of a church as the background to the last-mentioned picture is an agreeable and appropriate feature.

The Philosophical Basis of Religion; a Series of Lectures. By Dr. J. Watson. Pp. xxviii+485. (Glasgow: J. MacLehose and Sons, 1907.) Price 8*s.* 6*d.* net.

PROF. WATSON, who is already well known to philosophical students by his work on Kant, has, by the publication of this collection of lectures, laid a still larger circle of readers under an obligation. The recent congress at Oxford gave sufficient evidence of the present widespread interest in religion as a social phenomenon—an interest largely independent of any attitude towards its claims upon the individual. There will be many scientific students who will turn with profit to Prof. Watson's addresses—admirably lucid as they are, and agreeably free from technicalities—for a treatment of the subject that forms an entirely necessary complement to the comparative method.

The author presents his argument as an attempt to solve the problem of re-building upon a basis of reason the theological beliefs which (he holds) no longer rest securely upon their ancient foundation of authority. The solution he develops takes the form of a "constructive idealism" based upon "the principle that the world is rational and is capable of being comprehended by us in virtue of the rationality which is our deepest and truest nature." The fulfilment of this programme necessitates an examination, first, of typical views on the nature and functions of dogma (such as those of Newman, Loisy, and Harnack), and, secondly, of certain current philosophical doctrines (personal idealism, the "new realism," and pragmatism) that offer solutions of the author's problem which for one reason or another he is unable to accept.

The layman will find Prof. Watson a fair-minded, an interesting, and, on the whole, a trustworthy guide in all these matters, as well as in the lectures on theological history which follow in somewhat loose connection with the rest. He should be warned, however, that the account of the "new realism" given in the fifth lecture contains elements that most of the supporters of that doctrine would repudiate.

Every reader of the book will be grateful for the excellent summaries of the preceding argument which appear at the beginning of most of the lectures.

A Manual of Bacteriology, Clinical and Applied. By Prof. R. T. Hewlett. Third edition. Pp. xii+638. (London: J. and A. Churchill, 1908.) Price 10*s.* 6*d.* net.

THE publication of Prof. Hewlett's manual in its new edition serves to remind us of the enormous strides in our knowledge of bacteria which have been made within the last ten years. Bacteriology in its early days meant little more than the study of the morphology of the newly-discovered causes of disease and the search for those undiscovered. Then came the investigation of the poisons manufactured by the organisms; and now the bacteriologist is largely concerned with the substances whereby the organisms are controlled and defeated. Much of the new knowledge of bacteria has come with the discovery that the organisms once believed to be unique are in many cases only members of groups which number dozens or scores of individuals; and the aid of organic chemistry has been invoked to differentiate the members of these groups.

With this constantly widening field of work it has become increasingly difficult to give within a moderate compass an account of our present state of knowledge, and we can therefore all the more congratulate Prof. Hewlett on his success. Within the 600 pages of his book he has contrived to give an adequate account of the methods used in bacteriological research; of the morphology, appearances in culture, and distribution of the chief pathogenic bacteria; of bacterial toxins; of immunity, and the various methods by which it is sought; and, lastly, of the details of disinfection, and the examination of water, air, soil, and milk. He has wisely omitted many of the details of the more complicated methods, but wherever he has done so he has been careful to give a full reference to a source where the reader can obtain the information. In his treatment of some of the more recent work in bacteriology he, in our opinion quite properly, reserves his judgment of its value, while stating fully and fairly the claims advanced. Thus, for example, he still hesitates to accept without reserve the *Treponema pallidium* as the specific organism of syphilis, but adds that the majority of observers hold the opposite opinion strongly.

The illustrations are for the most part reproductions of actual photomicrographs, and are particularly well chosen and clear in outline. The only fault that we have to find with Prof. Hewlett is an occasional obscurity of language; in most instances the context removes any doubt as to his meaning, but in a few cases it is difficult to comprehend. Thus on p. 343 the language seems to imply that there were two dead men who recovered, and though, of course, that is not the meaning, the whole sentence remains obscure, even after the obvious correction has been made.

Ticks. A Monograph of the Ixodoidea. Part i. (Argasidæ). (London: Cambridge University Press, 1908.) Price 5*s.* net.

THE study of parasitic and disease-producing Protozoa, which has received such a great impetus of recent years, has caused much attention to be paid also to those groups of animals which, by their blood-sucking habits, are instrumental in transmitting the parasitic organisms from one vertebrate host to another. Ever since Smith and Kilborne first made known the *rôle* of ticks in transmitting Texas-fever in cattle, much attention has been directed to this group of arachnids,